ASTRONOMICAL SOCIETY OF LONDON.

February 13, 1829. No. 17.

Report of the Council of the Society to the Ninth Annual General Meeting, held this day.

NINE years have now elapsed since the establishment of this Society; and the Council cannot but again congratulate the members on the increasing interest which it excites, and which there is every reason to believe will continue to be maintained.

One of the first acts of the present Council was to cause an ephemeris of Encke's comet to be circulated, not only amongst the members of this Society, but also amongst such persons, in distant parts of the world, as were likely to make good use of it, hoping thereby to increase the number of well-authenticated and recorded observations of that singular and remarkable body, and thus facilitate the means of rendering it's theory more perfect. It's re-appearance excited a considerable degree of interest, not only amongst astronomers, but the public in general; and it's observed places verified, in an astonishing manner, the accuracy of the computations of the distinguished astronomer, whose name the comet bears. This comet, as well as that of 1825, known on the continent by the name of Biela's comet, will again appear in the year 1832; and there is no doubt but that the Council also of that day will direct their attention to the best mode of procuring observations of both those newly discovered attendants on our system.

The attention of the Finance Committee, appointed during the last year, has been directed to a new mode of arranging the accounts of the Society, whereby the labours of each successive Council, in auditing such accounts, will be considerably abridged. In the pursuit of this inquiry, they have discovered, amongst the arrears which have been annually brought forward as assets of the Society, some that appear to be due from deceased members, in consequence either of their not having been claimed within a reasonable and proper time, or from the names of the parties having been continued on the list of members, for want of a due notification of their decease; others that, on a minute examination by your Council, appear to be irrecoverable, either from the incompetency of the parties, or from some ambiguous interpretation of the regulations of the Society. Under these circumstances, the Council have considered it advisable to strike those sums out of the annual accounts, and to bring forward only those arrears which there may be a fair prospect of recovering; reserving for a separate and distinct list such sums as are doubtful, and the discharge of which must be left

entirely to the honour and feelings of the parties interested. The Council have taken such steps as they think will prevent a recurrence of this evil; and they trust that the General Meeting will approve the measures here adopted, which must tend to shew them, in a more proper manner, the correct state of their accounts, and the true situation of the affairs of the Society.

The following abstract of the receipts and expenditure during the preceding year, will shew the present state of the funds of the Society; viz.:—

Receipts.	£.	s.	d.
Balance of last year	243	9	3
Arrears, Feb. 1828:—			
Resident members	40	19	0
Non-resident	8	8	0
Ditto, which had been remitted	2	2	0
Contributions for 1828-9:—			
4 admissions	16	16	0
56 resident members	117	12	0
2 compositions	50	8	0
7 non-resident	58	16	0
1 year's dividend on 800*l.* Consols	24	0	0
1 yr.'s do. on 857*l.* 13*s.* 8*d.* new 4 per cents.	34	6	0
Sale of the Memoirs, By the collector, 32*l.* 18*s.* By the booksellers, 45 0	77	16	0
	£674	14	3

Expenditure.	£.	s.	d.
3 gold medals	29	19	9
2 pendulums	34	4	0
Printing	147	2	6
1 year's rent to Michaelmas	52	10	0
1 composition invested, omitted in last year's account	25	4	0
Copper-plate printing	4	18	6
Stationary and stamps	9	0	0
Autograph book, &c.	7	2	0
Commission to collector	15	13	6
Petty disbursements at the apartments	7	9	6
Postages, &c.	6	7	3
Balance	335	3	3
	£674	14	3

And the assets and present property of the Society are as follow; viz.:—

Assets of the Society.	£.	s.	d.
Balance in the hands of the treasurer	290	3	3
Due from Messrs. Baldwin and Co., booksellers	45	0	0
Bill not yet due	18	1	0
Arrears, Feb. 1828:—			
1 admission-fee	4	4	0
3 contributions of two years' standing	12	12	0
4 ditto, of one year's do.	8	8	0
Arrears of 1828-9:—			
3 admission-fees	10	10	0
27 contributions of 1 year's standing	56	14	0
5 non-resident contributions	42	0	0
	487	12	3
Stock in the funds; viz.:— 800*l.* Consols, 857*l.* 13*s.* 8*d.* new 4 per cents } valued at about	1570	0	0
Books unsold, now on hands: The several instruments already alluded to: Gold and silver medals, unappropriated; &c.			
From the above, however, are to be deducted—			
A bill due to Mr. Robinson, for microscopes	22	5	0
The printer's bill for the second part of Vol. III., not yet completed			

The thanks of the Society are due to the Finance Committee, for the time and attention which they have bestowed on this subject, and for their efforts in arranging and simplifying the accounts; but more especially to your indefatigable and zealous secretary, Mr. Stratford, who originated that Committee, and who has ever, on this as on all other occasions, and at a sacrifice of much valuable time, and in the midst of other numerous and important avocations, not only devoted himself to the advancement of astronomy, and the means of diffusing its benefits amongst mankind, but has also infused life and vigour into every measure suggested for promoting the objects of the Society, and for maintaining its respectability and independence.

But, whilst the Council can thus truly congratulate the Society on the continuance of this strength and zeal in the cause of their favourite science, they cannot but lament the loss of his excellent coadjutor, Dr. Gregory, who has, for a long time past, been prevented by ill health from attending the meetings of the Council and Society. Dr. Gregory was one of the original founders of this institution, and has ever shewn the greatest zeal in promoting it's interest and welfare. Constant in the discharge of his duties, whenever his health would permit, the Society has long witnessed his exertions in their cause; and although at present unfortunately deprived of the benefit of his powerful talents, they still look forward with hope that he will soon again be able to join their meetings, and assist them with his counsel and advice.

The total number of members and associates is 264; and the increase since the last anniversary, according to their several classes, as well as the present state of the Society, may be seen from the following abstract; viz.:—

	Compounded.	Resident.	Non-resident.	Honorary.	Total Members.	Associates.	Grand Total.
Feb. 1828 . .	38	88	89	1	216	32	248
Since elected	2	7	12	—	21	—	21
Since lost . .	—	4	1	—	5	—	5
Feb. 1829 . .	40	92	99	1	232	32	264

Amongst the accessions to the list of members during the course of the preceding year, the Council notice, with the most gratifying feelings, the name of His Royal Highness the Duke of Sussex, the patron of every good and useful undertaking, and a prince highly distinguished for his zeal in promoting every branch of science.

The Society has to lament the loss, by death, of two only of its members during the past year. These are Captain Pringle Stokes,

of the Royal Navy, who was engaged in surveying the coasts of South America; and Dr. William Hyde Wollaston.

To Dr. Wollaston every part of science seemed equally familiar; and of him it might perhaps be more truly said than of any philosopher who has preceded him, that "*nil erat quod non tetigit, nil tetigit quod non ornavit.*" Astronomy was one of his chief and favourite pursuits—a taste inherited from his father, and cherished by his intimacy with the late Astronomer Royal of Dublin (now Bishop of Cloyne) and the present Astronomer Royal of Greenwich—an intimacy commenced in early youth at Cambridge, and maintained through life. Science is indebted to him for many ingenious and important speculations; such are his papers published in the Philosophical Transactions, on horizontal refractions, and on the horizontal refraction and dip of the horizon, containing his curious and ingenious invention of the dip sector. Among the most remarkable of his astronomical papers, however, is that on the finite extent of the atmosphere, which affords a striking instance of the advantages that may accrue to science by the union of remote branches of knowledge in the same mind. The arguments brought forward in that paper in favour of the non-divisibility of matter *in infinitum*, from astronomical phenomena, carry with them at least every semblance of soundness, and afford a singular specimen of his acute and scrutinizing habit of thought; while the almost miraculous delicacy and curious felicity of his manipulation in the practical departments of science—that microscopic tact, which in a thousand instances led him, through routes impervious to grosser intellects, to the most striking, unexpected, and novel results—is there exemplified in a remarkable manner, in the minute and apparently insignificant apparatus with which he was enabled to verify his own views, under circumstances which would effectually baffle ordinary instruments and ordinary observers.

The sister science of optics is even more indebted to Dr. Wollaston than astronomy. His verification of the Huygenian law of double refraction; his investigation of the refractive and dispersive powers of bodies, as a separate branch of physical inquiry, on which the perfection of the achromatic telescope depends; his discovery of the dark lines in the spectrum, since independently observed, with more refined means, and in greater detail, by Fraunhofer; but chiefly as concerns our science, the ingenious and elegant method practised by him for perfecting the adjustment of the triple achromatic object-glass, give him the highest claims to eminence in this department. The instrument on which he tried and perfected this mode of adjustment is now, through his liberality, the property of this Society.

The Council think it right to include in this Report the letter containing his announcement of this valuable gift.

Dorset Street, Dec. 8, 1828.

My dear Sir,—Being in possession of a telescope which I hold in great estimation, and being desirous that its good

qualities should be properly appreciated, and that it may become useful, I think I cannot do better than present it to the President and Council of the Astronomical Society of London.

I annex a memorandum of my wishes in regard to the destination of the telescope, as well as to what regards its origin. I have had it properly put in order by Dollond, and I now send it to you, as President of the Society, to be held at the disposal of the President and Council.

As I highly appretiate the honour of being a member of that Society, so I heartily wish them success in the very interesting and laudable object of their pursuits, and am, with sincere respect and regard,

Most truly yours,

J. F. W. Herschel, Esq. V.P.R.S. W. H. WOLLASTON,
President of the Astronomical Society of London.

Memorandum alluded to in the foregoing letter.

This telescope is presented by Dr. Wollaston to the President and Council of the Astronomical Society of London, in hopes that they will not keep it useless, but lend it, or give it if they think proper, to any industrious and useful member of the Society, he not being at the time a member of the Council.

The telescope was made by Mr. Peter Dollond, in the year 1771, for the Rev. Francis Wollaston, F.R.S., who valued it very highly. Dr. Wollaston thinks that he has even improved it by screws added for the concentric adjustment of the object-glass, as described in the *Phil. Trans.* for 1822, p. 32.

The injunction contained in this letter, to render the instrument available for purposes of actual observation, has been complied with. It has been placed in the hands of Mr. Maclear, of Biggleswade, a member of the Society, for the purpose of enabling him to observe a series of occultations, computed by himself, of Aldebaran by the moon, and other similar phenomena.

Almost the last astronomical labour of Dr. Wollaston was a series of observations of a peculiar photometrical nature, for determining the relative brightness of the stars and of the sun. It has not yet been made public; but the results are such as to open new and more magnificent views of the constitution of the universe than even any which had preceded them.

Dr. Wollaston was born on the 6th of August, 1766, at East Dereham. He became a Tancred fellow of Caius College, Cambridge, shortly after taking his degree, and continued to reside there till 1789. He then removed to London for the improvement of his medical knowledge, and continued the practice of physic till the end of 1800, when an accession of fortune determined him to relinquish a profession he never liked, and devote himself wholly to science. It is from this period that we are to consider him as a public character in science. As a commissioner of longitude, he was ever

solicitous to promote whatever seemed likely to prove of practical utility, and render the longitude easy of measurement and calculation. Any well-grounded project for the improvement of chronometers was sure to find in him a firm supporter. The system of determining differences of longitude by sets of itinerant chronometers, as practised by Dr. Tiarks and Captains Foster and King, was warmly advocated and effectually supported by him.

Dr. Wollaston was many years a Vice-President of the Royal Society, and for a short time filled the chair of that illustrious body in 1820. He became a member of this Society in November 1828, under circumstances of which the irregularity could only be justified by the urgency of the case, and the impossibility of its being drawn into a precedent in future. Dr. Wollaston was proposed in the June meeting, and his certificate having hung till the following November, he ought, according to our rules, to have been balloted for at the ensuing meeting. The alarming situation of his health, and high probability of his dissolution previous to the December meeting, induced the Council at once to recommend to the meeting a departure from the established rule, and that the election should take place on the day already named; which was done, and received the unanimous sanction of the meeting, who insisted on dispensing with the formality of even a ballot. But the Council feel, that though such a case may justify the step, they must look to the general body of the members, now assembled on their anniversary, to ratify it, which they confidently expect will be done. His death took place shortly after; viz. on the 22d December, 1828.

At the last anniversary meeting, the Council reported the liberal donation, by Lieutenant George Beaufoy, of his father's astronomical instruments. They have this year again to congratulate the Society on two other distinguished marks of liberality and public spirit on the part of two of its members. The one, by Dr. Wollaston, of one of Dollond's celebrated triple object-glass achromatic telescopes, as already noticed: the other, by Dr. Lee, of one of Troughton's two-feet altitude circles, formerly in the possession of the Rev. Lewis Evans, a member of this Society. Dr. Lee purchased this instrument expressly for the Society; and the communication of the present was conveyed in the following very handsome letter, addressed to the Secretary, viz.: —

5, *College, Doctors' Commons, Dec.* 9, 1828.

Sir, — Having accidentally heard from that indefatigable officer, Captain Smyth, of the Observatory at Bedford, that a two-feet altitude circle, divided on gold, was to be procured, in consequence of the death of the Reverend Lewis Evans, of the Astronomical Society, I have had the good fortune to become the possessor of it.

Being deeply impressed with the conviction, that the establishment of the Astronomical Society of London must prove of great beneficial influence in diffusing a science justly considered as the summit of human acquirements, I consider it

one of the most gratifying events of my life to have been admitted into that useful and learned body; and being desirous of marking the high sense which I entertain for its zealous exertions in so noble a cause, I humbly request that the Society will honour me by accepting the above-mentioned circle, especially as I am informed that it is a production of the best days of the illustrious Troughton.

I have the honour to subscribe myself,
With much respect,
Sir,
Your faithful humble servant,

W. S. Stratford, Esq.
Secretary to the Astronomical Society.

John Lee.

This accession of strength in the department of Instruments induced your Council to form a Committee for drawing up a code of regulations, to be observed not only in the appropriation of these and other instruments that may come into the possession of the Society, but also by those who may require and obtain the loan of them; a measure which they trust will ensure the free and impartial use of them to such members as devote themselves to practical astronomy, without impairing the rights and claims of the Society to the property thus temporarily parted with; — hereby promoting their principal objects — the acquisition and diffusion of useful information. Copies of these regulations are printed, and will not only be circulated in the next monthly notices of the Society, for the information of the members at large, but will likewise be affixed to all the packages that contain the instruments.

It was stated in the last annual report, that the altitude and azimuth instrument, and the transit instrument (presented to the Society by Lieutenant Beaufoy), had been lent to Captain Smyth, of the Royal Navy. But Captain Smyth being desirous of exchanging that altitude and azimuth instrument for the altitude circle presented by Dr. Lee, and this being in accordance with the wishes of Dr. Lee, the Council have assented thereto. The altitude and azimuth instrument, therefore, presented by Lieutenant Beaufoy, being thus again at the disposal of the Council, they have granted the loan of it to the Rev. Michael Ward, one of the members of this Society, whose zeal in the cause of astronomy is well known, and in whose hands this instrument will not remain idle.

The triple object-glass achromatic telescope, presented by Dr. Wollaston, has been placed (as already mentioned) in the hands of Mr. Maclear, of Biggleswade, another of your members, and to whom the Society is indebted for the computations of the occultations of Aldebaran for the present year, to which your Council will more particularly allude in the sequel. This gentleman has paid considerable attention to this branch of the science; and it is hoped that he will, amongst his other pursuits, and as opportunities may from time to time offer, help to fill up, by means

of this instrument, the void that has been made in this class of detached observations by the death of the late Colonel Beaufoy.

In the last Report it was stated, that two invariable pendulums, belonging to the Society, had been intrusted to the care of Captain Foster, in his present scientific voyage. The Council have not yet received any official communication from that active and intelligent officer; but they have heard that he was prevented, by ill health, from swinging these pendulums at Monte Video; and that he proposed to swing them at Staten Island, to which place he was about to proceed.

One of the clocks, alluded to in the last Report, as presented by Lieutenant Beaufoy, is in the hands of Mr. Herschel, your President.

Thus, it will appear that the whole of the instruments presented to, and purchased by, the Society are in a state of activity, and placed in such hands as are likely to use them for the promotion and advancement of the science,—the true end and object of this institution.

In order to facilitate and encourage the recording of observations, and with a view of preserving an uniformity to the methods usually adopted in the public observatories, the Council have caused *skeleton-forms* to be printed on large ruled paper, so as to be bound up together in a book. One set of these forms is intended for the transit instrument, and the other for a meridianal circle, or quadrant. And those members, to whom such forms may be practically useful, may have copies of the same, on application to the Secretary.

The subject of Occultations has at all times been an interesting and important one, both to the practical and theoretical astronomer; and they frequently present some remarkable phenomena with respect to light, when the edge of the moon comes in contact with the star about to be occulted,—the star sometimes appearing to be *projected on the disc of the moon.* This circumstance has been more particularly alluded to, and numerous instances given, in a recent paper read before the Society by Mr. South; wherein he remarks, that this appearance is more frequent (at least more frequently recorded) as to Aldebaran, than as to any other star, accompanied, however, with anomalies for which it is difficult to account. As the present position of the moon's nodes is such as to cause her to pass over Aldebaran at every lunation for some time to come, the Council have thought it would be gratifying to the members, and also promote the interests of science, if they procured the computation of all the occultations of Aldebaran that will be visible in this quarter of the globe during the present year. This subject was no sooner mentioned, than two gentlemen, well known for their zeal in astronomy, and for their knowledge of the subject, kindly undertook the labour of the calculations: and the Society are indebted to Mr. Maclear, already mentioned, and Mr. Thomas Henderson of Edinburgh, for the ephemeris of the occultations of

Aldebaran, which has been circulated in the monthly notices, — and for which mark of attention and public spirit, the Council and Meeting have awarded their thanks. Your Council, conceiving that it would advance the interests of astronomy to obtain as great a number of observations as possible, have caused an extra number of copies to be struck off, with a view to circulate them in various parts of Europe, and thus induce astronomers to look out for, and record, the phenomena which they may observe.

Towards the close of the year now expired, your Council have devoted, as usual, one of their meetings to a consideration of the subjects for which they conceived the Medals should be awarded, agreeably to the original views and intention of the Society. And they have resolved to give one of the gold medals to each of the three following persons, viz.: to the Rev. Dr. Pearson, Treasurer of this Society, for his recent Treatise on Practical Astronomy; to Professor Bessel, of Königsberg, for his numerous and important astronomical observations, particularly those made in *zones;* and to Professor Schumacher, of Altona, for his various scientific publications, especially his *Astronomische Nachrichten*, which has rendered such essential aid to the progress of astronomy. These Medals will be delivered by the President, in the usual manner, at the close of this meeting.

But although the Council have marked, in this expressive manner, their opinion of the works above alluded to, they have not been insensible to the merits and claims of other labourers in the cause of astronomy. And, amongst the various papers read at the meetings of the Society during the preceding year, your Council cannot refrain from noticing the very laborious and important one by Mr. William Richardson, " On the Amount of the Constant of Aberration," which has been the result of computations made on upwards of 4000 observations of such stars as are favourably situated for the accurate determination of this element. Mr. Richardson is well known to this Society as one of the computers of the Catalogue inserted in the Appendix to the second volume of the Memoirs, — the whole of which passed through his hands. In undertaking the arduous task, however, of computing the *constant* above alluded to, he has been actuated only by his inherent and ardent love of science, and has had solely in view the promotion of astronomy, even in its most minute branches. Employed in the active duties of an observer at the Royal Observatory at Greenwich, he has devoted his leisure hours to the investigation of a subject, which requires labour and attention sufficient to appal the most strenuous supporter of astronomy, and a sacrifice of time by no means indicated by the minuteness of the final result obtained. Mr. Richardson's paper was not presented to the Society till the last meeting; and your Council regret that the short period which has elapsed has prevented them from passing a more decided expression of their sentiments on its merits.

There are few things that tend more to the promotion of astronomy, either theoretical or practical, than the publication of an

accurate and comprehensive ephemeris, whereby the observer may be informed when and where to look out for the various phenomena that may be expected to occur from time to time. This is indeed a subject of such obvious necessity, and of such national importance, that every enlightened state has hitherto encouraged and patronised the publication of such a work. It was reserved, however, for the present era to witness one of the most complete productions of this kind that has ever yet appeared; and edited, moreover, by one of the most distinguished astronomers in Europe. Your Council evidently allude to the astronomical ephemeris, lately published at Berlin, by Professor Encke, for the year 1830, and intended to be annually continued. In this work, the practical astronomer will find, ready to his hands, every information that may be required in the active discharge of his duties in the observatory, and stated with a degree of order and minuteness unparalleled in productions of this kind. No subject seems to have escaped the attention of this celebrated astronomer, who appears to be sensible of all the wants that attend an observer. With a bold but discriminating hand, he has struck out a new path for the formation and arrangement of a national ephemeris, of which he may be justly proud, and which does honour to the country under whose auspices it has appeared.

Whilst the Council thus congratulate the members on the advancement of astronomy in the northern hemisphere, they cannot be insensible to the benefits to be derived also from the progress of the science in the south. The rich harvest brought to this country by the activity and perseverance of Sir Thomas Brisbane and Mr. Dunlop will be followed up by new labourers in the field, from whom there is a prospect of further additions to our store of knowledge. For it is understood to be in the contemplation of government to adopt the observatory at Paramatta, already so distinguished in the annals of astronomy: and it is hoped that the opinion expressed by your Council on this subject (in consequence of a communication from the President of the Royal Society) will have some weight in promoting the objects of astronomy in that hemisphere.

The Council take this opportunity of announcing, that the printing of the second part of the third volume of the Memoirs is very nearly finished; and that it is intended that this shall complete the volume. The delay which has arisen must be attributed in a great measure to the numerous calls that have been made during the last year on the time and attention of your indefatigable Secretary, Mr. Stratford, on whom, indeed, (in consequence of the lamented illness of Dr. Gregory), the whole duty of the office has devolved.

The Council have thus endeavoured to give a brief abstract of their proceedings, and a summary of the principal subjects that have engaged their attention during the past year. They trust that the Members will feel that they have not abated in their zeal for the great cause for which the Society was originally instituted — the

advancement and promotion of astronomy, — but that they have applied their limited means in the most efficient manner, towards forwarding the objects and views of the Society.

(*The President then addressed the meeting on the subject of the award of the Medals, as follows* :—)

Gentlemen, — I have now to claim your attention to the subject of our Annual Prizes. In the distribution of such honours there is frequently a difficulty of choice, from the number and strength of competing claims; and the past year has produced matter of much interest to astronomers. The comet of Encke has revisited our sphere, — not, like a forgotten thing, to take us unawares, but as an old, familiar friend, giving due notice of his arrival, and strict to his appointment. Of all the wonders that astronomy has disclosed to us, there is none more astonishing than to see this dim, misty, all-but-incorporeal thing, whose parts can have no more cohesion than the floating particles of the lightest fog, borne along by its inertia, and commanded by its gravity, like the denser planets with which it must henceforth be associated. We look to this comet as the revealer of many secrets, such as whether there exist a ponderable, or at least material ether in the planetary spaces, or any vestige of unabsorbed, nebulous matter in our system, susceptible of being caught up by it, and thus diminishing its speed and retarding its progress.

The list of papers which has been read to you, and which has been stated in the Report of your Council, will prove the zeal and diligence of our British astronomers and our associates; and the same spirit which has now for many years been prevalent on the Continent still animates it, and continues to produce the happiest results. At home we have further to congratulate the astronomical public on the attention that has been drawn to the improvement of the achromatic telescope, whether by the use of different media from the usual ones, or by a different combination of those commonly employed; and on all hands we find no reason to regard astronomical discovery as having relaxed in its progress.

The first Medal which I shall this day have the honour to present, according to the award of your Council, is a Gold Medal to Dr. Pearson, for his book, entitled, "An Introduction to Practical Astronomy;" one of the most important and extensive works on that subject which has ever issued from the press. The treatises existing on theoretical astronomy are numerous and extensive, as befits the dignity and abstruseness of the subject; but works on the practical department, explaining the best methods of observing, and the precautions necessary, condensing and bringing together the tables most compendious or more generally adopted, and describing in detail the various instruments employed, — the manner of using and adjusting them, — and the species of observations for which they are adapted; — such works were altogether wanting, or existed at best in a very insufficient state. We have here, however, the desideratum supplied. Dr. Pearson, in his first volume, has brought

together all the tables which the practical astronomer is ever likely to want. Nor is this a mere compilation. Nearly half the volume consists of new Tables, and the rest are for the most part either extended or improved in their arrangement. The most considerable and striking part of Dr. Pearson's work, however, is the second volume, now just published. This is destined to a description of instruments, and is accompanied with a series of plates, so complete as almost to render description superfluous. It is no small advantage in such a case, to know that the instruments described have been for the most part in the actual possession of their describer, and used by him in actual observation. Such has been the case in this instance.

(*The President then, addressing Dr. Pearson, continued thus:*—)

Dr. Pearson, — You have applied your splendid collection of instruments to a most excellent use. You have not frittered your time away in commencing and breaking off a series of observations with one and with another, at the impulse of the moment; but, by studying their peculiarities, noting down their adjustments, and delineating their forms, you have given a most useful aid to those of less experience than yourself, and have added a value to every instrument you have described, by your labours. In dedicating this second volume of your book to our admirable Troughton, you have raised him a monument which must be peculiarly gratifying to his feelings. In your pages he may see how large a place he occupies in his art, and in the science on which it depends; and we all rejoice that he has lived to receive this applause at your hands. For yourself, sir, be assured, this Society, who know the sacrifices you have made, and the liberality with which you have set at nought all calculations of profit and loss in producing a work of such vast expense and such small probable return, congratulate you heartily on thus bringing your labours to a close, and mark the epoch by presenting you with this Medal.

(*The President then resumed his address to the Members, as follows:*—)

Gentlemen,—The next Medal which has been awarded by your Council is a Gold Medal to Professor Bessel, for his observations of the stars in *zones*, made by him at the Royal Observatory of Königsberg; — a vast undertaking, and one which would alone suffice to confer immortal honour on a name, which has already so many other independent claims to astronomical distinction. The attention of astronomers, in fixed national observatories, up to a late period, was almost exclusively confined to observations of the sun, moon, and planets, and a moderate number of the principal fixed stars. The smaller stars, the minor host of heaven, were systematically neglected, and the conspicuous ones only deemed worthy of being observed in any other than a desultory way. Their utility for the purposes of nautical astronomy might of course be expected to draw upon the most remarkable ones a proportionate attention;

but astronomers, like the vulgar, had been too much influenced by appearances and by glitter, and had fallen into habitual neglect of the rest, or contented themselves with rough approximations to their places, sufficient to mark them down in maps, or include them in lists and approximate catalogues; but inadequate to the determination of any delicate question as to their proper motions, parallax, &c. To this, however, one splendid exception must be made in the Catalogue of Piazzi. This record of the places of more than 7000 stars of all magnitudes, determined with an excellent instrument, with all the care of a diligent and cautious observer, and from several observations of each, is one of the finest monuments of astronomical research. Nor ought the labours of Lalande to be forgotten. His examination, indeed, was extended to an enormous list, to no fewer than 50,000, and was conducted, like Professor Bessel's, in zones. It has been rendered available, also, to astronomers, by tables of reduction, of the simplest possible kind, published by Professor Schumacher, and is indeed a most useful and valuable collection. It labours, however, under the disadvantage of a great inferiority in an instrumental point of view, and therefore can be nowise regarded as superseding or anticipating the more refined inquiries of Professor Bessel.

It would be quite superfluous to speak here of the general merits of Professor Bessel as an astronomer, or of the excellence of the observations regularly made in the observatory under his direction. We know and appretiate them; but they are not to be made the subject of our remarks or our praise on this occasion. The observations for which your Medal is awarded to him were commenced in 1821, and have been continued with little intermission ever since, at the Royal Observatory at Königsberg, with the meridian circle of Reichenbach, having a magnifying power of 106 applied to a most excellent telescope. This instrument being confined to a zone of about two degrees in breadth, is made to oscillate or sweep up and down continually, while the heavens pass in review before the observer by their diurnal motion, and all stars, down to the ninth magnitude, which pass the field, are taken at once in right ascension and declination, and read off by the clock and limb of the circle. This mode of observing presents two capital advantages,—viz. multitude of objects, and facility of reduction. Of the former we may judge by the fact, that in some of the zones we find between three and four hundred objects observed at a sitting: with respect to the latter, a little table, of the simplest use and most compendious form, is attached to each zone, and by its aid the readings of the clock and limb are at once reduced (by a calculation comprised in three lines) to the mean right ascensions and declinations of the objects at a fixed epoch, freed from instrumental error, and ready for the catalogue. Those only, who know by experience the labour of reducing observations not made on this system, can imagine the saving of toil and drudgery thus arising. Nay, more—it renders the observation-book itself available as a catalogue; for, by the system of indexing the zones, any point

in the heavens may at once be referred to, and every object there observed at once reduced, without need to turn over the book, to enter into any inquiry, or in any way refer beyond the page before us and the table of reductions in the beginning of each volume. This is the perfection of astronomical book-keeping.

This course of observations was commenced, as I have already said, in 1821; and you may judge of the industry and perseverance with which it has been prosecuted, by the fact, that, by the end of 1824, the whole equatorial belt, of 30° in breadth, of the heavens, had been swept, and between 30 and 40,000 stars observed. But this did not satisfy the zeal, or exhaust the patience, of M. Bessel. He has since continued the work northward with unabated ardour, and is extending his zones to the 45th degree of northern declination: thus embracing, in the whole, sixty degrees of the finest part of the heavens.

A great many double stars, some of them very delicate ones, have been detected in these sweeps; they are included in M. Struve's splendid catalogue of these objects. Nor is it at all improbable that many new planets may have been seen, and, on a repetition of the observations, will be found missing. In a word, we have, in this collection, one of those great masses of scientific capital laid up as a permanent and accumulating fund, the interest of which will go on increasing with the progress of years. It is a harvest sown, and already springing, but of which the ripened produce is destined for after generations. Yet the crop, if a remote, is a sure one. It will neither be uprooted by political convulsions, nor stinted by neglect, nor spoiled by premature gathering in. The language of such a record is like that of prophecy. It is written, but we cannot yet read it. It is full of truth, but not for us. It contains the statement of a vast system, but future generations must develope it. Could it be permitted us to look forward and draw aside the veil which a few centuries interpose between us and its interpretation, we might expect to see all the great questions which agitate astronomers set at rest, and new ones, more refined, and grounded on their solution, arising. Some minute and telescopic atom will perhaps have become the stepping-stone between our system and the starry firmament — its parallax will mark it for our neighbour — and either its fixity will demonstrate the equilibrium of our immediate sidereal system, or its proper motion reveal to us the nature and extent of the forces which pervade it. The orbits of those remarkable stars which are ascertained to be really *erratic*, or which have a proper motion too large to be overlooked, such as 61 *Cygni* and μ *Cassiopeiæ*, will become known. They will be seen to deviate in their paths from great circles of the heavens — their convexity or concavity will mark the directions, and their changes of velocity the intensities, of the forces which urge them. Already, since the date of the first catalogue of fixed stars, the former of these wonderful objects has moved over no less than four degrees of the heavens. Had it been accurately observed but once in a century, what might we not have known! Let this con-

sideration stimulate astronomers to follow up the splendid example Professor Bessel is setting, and complete and pursue the gigantic task he has carried on so far, but which is beyond the power of any one man to go through, much less to repeat. How much is escaping us! How unworthy is it of those who call themselves philosophers to let these great phenomena of nature — these slow, but majestic, manifestations of the power and glory of God — glide by unnoticed, and drop out of history, beyond the power of recovery, because we will not take the pains to note them in their unobtruding and furtive passage; because we see them in their every-day dress and mark no sudden change; and conclude that all is dead, because we will not look for the signs of life; and that all is uninteresting, because we are not impressed and dazzled.

We must not, however, be hasty in our reproaches. There is a general sense afloat among the continental astronomers, of the necessity of laying a foundation for future sidereal astronomy, as deep and as wide as the visible constituents of the universe itself. Nothing less than ALL will be enough — *quicquid nitet notandum.* To say, indeed, that every individual star in the milky way, to the amount of eight or ten millions, is to have its place determined and its motion watched, would be extravagant; but at least let samples be taken — at least let monographs of parts be made, with powerful telescopes and refined instruments, that we may know what is going on in that abyss of stars, where, at present, imagination wanders without a guide. Let us at least scrutinize the interior of sidereal clusters. Who knows what motions may subsist, what activity may be found to prevail, in those mysterious swarms? Or if we find them to be composed of individuals at rest among themselves — if we are to regard them as quiescent societies of separate and independent suns, bound by no forcible tie like that of gravity, but linked by some more delicate and yet more incomprehensible cause of union and common interest — the wonder is all the greater. We walk among miracles, and the soul yearns with an intense desire to penetrate some portion of those secrets, whose full knowledge, after all, we must refer to a higher state of existence, and an eternity of sublime contemplation.

Another Gold Medal, Gentlemen, has been awarded to M. Schumacher, for the important services rendered by him to both practical and theoretical astronomy by the publication of his various astronomical tables, and of his work entitled *Astronomische Nachrichten.*

Astronomy is a science peculiarly in unison with the German national character. The persevering industry which forms so striking a feature in it, is the quality, of all others, requisite for an astronomer — that diligence which never wearies, and which, working slowly, and destroying nothing that is done,* goes on

* Beschäftigung die nie ermattet, die langsam wirkt doch nie zerstört, &c. — *Schiller.*

adding grain by grain to the mass of results, and accumulating them with a kind of avarice to swell the heap;—that pains-taking scrutiny which penetrates through all details, and will not be satisfied till perfection is attained. And, on the other hand, an enthusiasm seemingly incompatible with this plodding turn, yet often co-existing with it in the same mind; a love of systems for their own sake; a spirit of speculation, sometimes bordering on wildness; and an ardent inherent love of the vast and wonderful. Among minds of this turn it is no wonder that astronomy should flourish — with enough of sublimity and mystery to exhaust the wildest imagination, and enough of laborious detail to keep in employment the most patient industry. Accordingly, Germany has always been fruitful in astronomers, and (regarding as Germans all who are bound in the common family tie of language and manners) German astronomy has at present reached a pitch of eminence, which only national pride prevents our acknowledging to be unexampled in the history of the science — whether we consider the researches of their theorists, the activity of their computers, or the number and importance of their national observatories: or those of Russia, several of which are manned (so to speak) with directors and assistants who have been educated in the German school, and transplanted from German observatories, and from the personal tuition of their most illustrious men, who have worked with them as their friends and pupils, rather than as mere assistants, and who look up to them with the veneration of the scholar to his master.

Among all these, and among those numerous and talented individuals throughout the continent, and in England, who are attached to astronomy professionally, or from love of the science, the *Astronomische Nachrichten* of Professor Schumacher establishes a point of concourse — a complete bond of union: we have there a theatre of discussion of whatever is most new and refined in the theory and practice of astronomy — the utmost delicacies of computation and scrupulous investigation of instrumental errors are given by those most competent to supply and to judge of them. To its pages observations of every kind find their way, especially those which depend for their utility on corresponding observations, or which lose their interest and importance by long suppression. Not a comet appears but *there* we find its elements handed in from all quarters with emulous rapidity — occultations — moon culminating observations — computations of longitudes and latitudes — disquisitions on practical points — descriptions, advertisements, and prices of instruments — in a word, every thing which can awaken and keep alive attention to the science — every thing that can facilitate the contact of mind with mind. Every one who has attended to the progress of knowledge in recent times, must feel all the importance of such an engine. But it cannot be kept in action without a strong presiding power. In any inferior hand it would languish, and soon fall into disrepute and inaction. Professor Schumacher is, of all men, that one whom the voice of Europe would have fixed on for the conduct of such a work: an excellent astronomer himself, and

presiding over an observatory in which every thing is delicate and exquisite, he possesses that practical and theoretical knowledge which commands respect, and gives his acceptance or rejection of contributions a weight from which there is no appeal. He has, moreover, the eminent but merited good fortune to possess the full and effective support of a Government deeply impressed with the importance of astronomical science. With this powerful aid, which would have been accorded to no other, he has been enabled to establish sure and regular communications with every part of the civilized world — and to face an expenditure which, under similar circumstances, no private individual would have ventured to undertake. He has thrown his whole weight into the scale of advancing science; and the effect has been, the establishment of a great European astronomical republic, with a common feeling, and a sense of common interests.

But the services rendered by M. Schumacher to astronomy are not limited to this publication. A numerous and useful collection of tables has been edited by him, under the title of *Hülfstafeln*, or assistant tables, and others. One of these volumes is devoted to facilitate the reduction of the observations of Lalande in the *Histoire Céleste*, on the same plan with those used for the reduction of Bessel's zones. This truly useful work rescues from oblivion the labours of Lalande, and renders his observations available to science. M. Schumacher, liberally assisted, in a pecuniary point of view, by the Royal Danish Hydrographic Office, has also followed up the example set by the Coimbra Ephemeris, of the publication of lunar distances from the planets, — thus rendering available a new branch of nautical astronomy, and hastening the period when observations of the planets at sea would have naturally been called for.

In the computation of the assistant tables, M. Schumacher has had most active assistance from several accomplished Danes; of whom I may mention Hansen, Clausen, Ursin, Nissen, Nehus, Zahrtmann, and Petersen. In honouring the principal, we honour the accessaries; and we trust that the tribute of this passing notice will not be displeasing to them and their coadjutors.

Captain Smyth, — As you are kind enough to act as proxy for Professors Bessel and Schumacher, receive for them these their respective Medals; and, in transmitting them, take care to convey to them the expression of our gratitude and admiration for the services they have rendered to our science, and our wishes that their brilliant and useful career may be prolonged yet many years, with increase of glory, and with health and prosperity to enjoy it.

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